REMARKS/ARGUMENTS

Reconsideration is requested of all rejections based on 35 U.S.C. 103:

Examiner's relies primarily on Kraft et al. (US 6,136,654). A key section of Kraft cited by Examiner is col. 4 lines 50-55 where he quotes Kraft as teaching that nitrogen bearing layer 20 is formed by means of decoupled plasma nitridation. This is, however, NOT what Kraft actually teaches. Rather, what Kraft says is "Preferably the plasma is a high density plasma (preferably formed from a helicon source, a helical resonator source, electron-cyclotron resonance source, or an inductively coupled source -- or it can be a low density plasma)...".

None of the examples given by Kraft cover the case of a decoupled plasma system, which is what the present invention specifically teaches. Note, too, that in our specification there is no mention of any other type of plasma source. This is not accidental. The reason the present invention teaches using a decoupled plasma source (and only a decoupled plasma source) is that the latter delivers only low energy ions whereas all those mentioned by Kraft provide high energy ions. This is an essential feature of the present invention (as will become clearer below) not just one of many plasma systems that could have been used.

Examiner goes on to state that "Kraft does not disclose that the temperature is between about 1,000 - 1,100°C and a pressure between 5 - 15 torr and for about 60-150 minutes." and then argues that this is simply a matter of routinely optimizing a range of values which does not make for novelty. This argument by Examiner would be valid if Kraft's process included an annealing step. But it does not! See for example

Kraft's FIGs. 4a and 4b.

Adding an additional step to an existing process is never obvious since it makes the modified process more expensive than the original. Clearly the addition of the extra step improves the process in some way not foreseen by the original inventor. Also, please note that we expressly state in our specification (page 5 last 3 lines) that the annealing step is a key feature of the invention i.e. that it is critical for the invention to work.

Kraft and the present invention teach different processes:

KRAFT : By using high energy ions, Kraft causes them to penetrate the substrate by a relatively large amount so he needs to take no further action. Kraft's invention also depends on using high energy ions to sputter away some of the silicon oxide. Thus Kraft teaches a relatively cheap process which achieves nitridation and oxide trimming in a single step. Not mentioned by Kraft (understandably!) is the fact that his process introduces a certain amount of structural damage, making for a less than optimum final result.

PRESENT INVENTION : By using low energy ions, the present invention deposits nitrogen only very close to the surface. This is then followed by an annealing step which drives this deposited nitrogen into the bulk by diffusion. Between the reduced amount of initial damage and the healing effects of the anneal, the result is a product having less structural damage than Kraft's. The price for this improvement is a slightly more expensive process and no accompanying oxide thickness control.

In view of the above arguments, applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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